

Building a Network

Introduction to Basic Concepts

PC Network Card



Network interface card
(NIC)

Laptop NIC



In computer networking, **NIC** provides a hardware interface between a computer and a network. The term NIC most commonly refers to [network adapter](#) hardware in the form factor of an add-in card; for example, a PCI or PCMCIA card. These devices plug into the system bus of the PC and include jacks for network cables.



motherboard

Wall Jack



A wall jack is an outlet on the wall that has Network wiring behind it which connects to the patch panel in the network wiring closet.

This provides easy access from the computer to the network wiring closet.

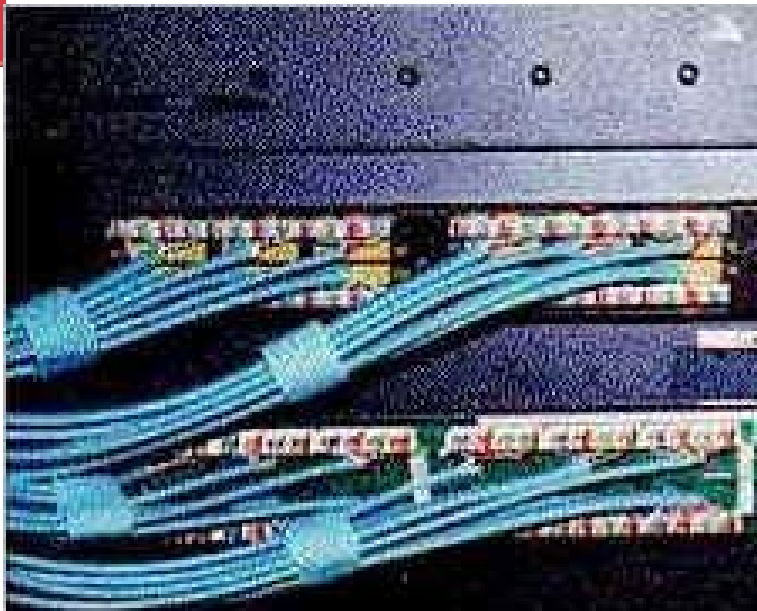
These are uniquely numbered and correspond to the number on the patch panel.

Patch Panel

Network wiring in the walls, from the wall jack to the network closet are all terminated in a patch panel. Each port on the patch panel corresponds to one wire and one wall-jack. They are numbered to match the wall jack.



front



back

Switch



A **switch** is a small device that joins multiple computers together.

Switches look nearly identical to hubs, but a switch generally contains more "intelligence" (and a slightly higher price tag) than a hub. Unlike hubs, switches are capable of inspecting the data packets as they are received, determining the source and destination device of that packet, and forwarding that packet appropriately. By delivering messages only to the connected device that it was intended for, switches conserve network bandwidth and offer generally better performance than hubs.

Like hubs, switches primarily are available for Ethernet, come in a range of port configurations starting with the four- and five-port models, and support 10 Mbps Ethernet, 100 Mbps Ethernet, or both

Patch Cables



Patch cables are used to join network devices together.

Computer → wall jack

Patch panel → switch

Routers



CISCO router

A **router** is a physical device that joins multiple wired or wireless networks together. Routers at this command connect the “inside” and “outside” worlds together.

Build a Network

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What is the correct order?

Switch connects to
router

Wall jack connects to

Router connects to
internet

Patch panel
connects to

Computer
connects to

Inside wiring
connects to

Build a Network

the correct answers

Computer
connects to
wall jack connects to

Inside wiring
connects to

Patch panel
connects to

Switch connects
to

Router connects to
internet

Modem

Modem" is an acronym for "**M**odulator **D**emodulator."

Traditionally, a modem converts data between the *analog* form used on telephone lines and the digital form used on computers for the purpose of computer-to-computer communication. Standard modems can transmit data at a maximum rate of 56,000 bits per second (bps) or 56kbps.

More recently, modems for cable and DSL service have come to be known as *digital modems*. Cable and DSL modems use broadband signaling techniques to achieve dramatically higher network speeds than traditional modems.

Cable Modem

A cable modem typically connects a cable wall hookup to a PC's 10BASE-T Ethernet card. Utilizing an always-on connection, cable modems transfer data across local cable TV lines, toggling between analog and digital signals. With data transfer rates comparable to DSL, cable modems (1.5 - 2.5 Mbps) are considerably faster than dial-up modems (28.8 - 56 Kbps) and ISDN (128 Kbps).

No modems are
allowed on
NDCSW networks

Internet Protocol Address

An **IP address** is the logical address of a network adapter. The IP address uniquely identifies computers on a network.

An IP address can be private, for use on a LAN, or public, for use on the Internet or other WAN. IP addresses can be determined statically (assigned to a computer by a system administrator) or dynamically (assigned by another device on the network on demand).

IP addresses consist of four bytes (32 bits). Each byte of an IP address is known as an octet. Octets can take any value between 0 and 255, but various rules exist for ensuring IP addresses are valid.

Examples: **159.71.224.101** full network address of a device. Listens only for packets addressed to it specifically.

159.71.224.xxx router here at Navsta is programmed to listen for any packets beginning with 159.71.224 and anything in the last octet.

159.71.xxx.xxx NMC San Diego router listens for any packets beginning with 159.71 and anything in the last two octets.

Start-Run-cmd (enter) ipconfig (enter)